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USSR Report

CONSTRUCTION AND EQUIPMENT

No. 73

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CONSTRUCTION

USSR MINISTER OF INDUSTRIAL CONSTRUCTION INTERVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 32, Aug 82 (signed to press 2 Aug 82) p 2

[Interview with A. M. Tokarev, USSR Minister of Industrial Construction, by EKONOMICHESKAYA GAZETA: "Builders Stand a Labor Watch" under the rubric "Our Interviews"]

[Text] [Question] Aleksandr Maksimovich, the 26th CPSU Congress emphasized that the new five-year plan will be a major test to builders. The readers of EKONOMICHESKAYA GAZETA are interested in knowing whether the work collectives of your branch are passing that test and fulfilling the plan and the socialist pledges for 1982 and for the five-year plan as a whole.

[Answer] Having launched the socialist competition in honor of the 60th anniversary of establishment of the USSR, the collectives of the USSR Ministry of Industrial Construction [Minpromstroy] strive to fulfill fittingly the entrusted tasks and pass with flying colors the test of the five-year plan.

This year large-scale facilities have been put into operation for the production of: 20,000 tons of butadiene at the Novokuybyshev Petrochemical Combine ([built by] Trust No 25 of the Main Central Volga Region Construction Administration [Glavsredvolzhskstroy]), and 200,000 tons of ethylene at the Kazan' Organic Synthesis Production Association [PO "Orgsintez] ([built by] the Kazan' Chemical Construction Trust [Kazan'khimstroy] of the Main Tatariya Construction Administration [Glavtatstroy]. Other large-scale facilities to have been put into operation were those for the deparaffinization of 600,000 tons of diesel fuel at the Novopolotsk Petroleum Refinery ([built by] Trust No 16, Petroleum Construction [Neftostroy], of the Belorussian SSR Minpromstroy; three poultry raising installations designed for 6 million broilers at the poultry factories in Tula ([built by] the Tula Sovkhoz Construction Trust [Tulasovkhozstroy]), Priirtyshskaya (]built by] trusts Nos 2, 3, and 5 of the Main Omskaya Oblast Industrial Construction Administration [Glavomskpromstroy]), and Vitebsk ([built by] Trust No 9 of the Belorussian SSR Minpromstroy. Broad-scale work is under way to build the future giant of the gas industry--the Astrakhan Gas-Condensate Plant ([built by] the All-Union Association for Special Industrial Construction [VO Soyuzspetspromstroy].

Eleven new installations and facilities were put into operation ahead of schedule at existing enterprises such as the L'vov Conveyer-Construction Plant ([built by] the L'vov Industrial Construction Trust [L'vovpromstroy]), the Ivan-Frankovskiy Reinforcement Plant ([built by] the Carpathian Construction Trust [Prikarpatstroy]), the Odessa Precision Machinetool Plant ([built by] the Odessa Industrial Construction Trust [Odespromstroy]), and the Kremenchug Proteins and Vitamins Combine ([built by] the Kremenchug Petrochemical Construction Trust [Kremenchugneftekhimstroy].

But the situation is not as good everywhere. The plans are being underfulfilled on the construction sites of the USSR Ministry of Petrochemical Industry, the Ministry of Chemical Industry, the Ministry of Petroleum Industry, and the USSR Ministry of Ferrous Metallurgy. The facilities of the Novogroznenskiy Petroleum Refinery (Checheno-Ingush Construction Administration) are being erected too slowly, and this also can be said of the construction of the Borislav Chemical Plant (Drogobych Industrial Construction Trust [Drogobychpromstroy]), the Nairit Production Association in Yerevan (Yerevan Chemical Construction Trust [Yerkhimstroy]), and the Lys'va Metallurgical Plant (Lys'va Industrial Construction Trust [Lys'vapromstroy]). Our ministry is, jointly with the customers-ministries, taking steps to eliminate the shortcomings.

[Question] How is the situation with the construction of facilities of the agro-industrial complex?

[Answer] During the current Five-Year Plan period the USSR Minpromstroy is to carry out 6 billion rubles of subcontractor operations on the pertinent construction sites and put into operation more than 500 installations and facilities. This year alone our ministry is to handle one-fifth of construction and installation operations on projects of the agroindustrial complex--operations worth approximately 1.2 billion rubles, with 116 facilities and installations to be put into operation.

The [ministry's] collegium has outlined a broad program for the development of existing construction-industry facilities and establishment of new ones to serve the organizations handling construction projects for the agroindustrial complex. A system for prefabricated long-range continuous construction [SIDPS] is operating on projects of the meat and dairy industry. A similar system will soon begin operating on other food-industry projects. Our construction of a number of projects in the Nonchernozem Zone is also based on this system.

We are working on a "Food Program ASU [Automated Control System]." Jointly with the RSFSR Ministry of Agriculture we have drafted measures to introduce the continuous method of construction ["nepreryvka"] developed in Orel, which next year we will apply on production and non-production projects in Orlovskaya, Tul'skaya, and Kaluzhskaya oblasts.

The socialist pledges adopted by the USSR Minpromstroy for 1982 provide for the pre-term completion of 14 installations and facilities of the agroindustrial complex. Valuable initiative for the pre-term activation of capacities and fulfillment of the volume of operations was shown by the collectives of construction, installation, and project-design organizations, as well as of tractor and agricultural machine building enterprises,in the Khar'kovskaya Oblast. The CC CPSU has approved that initiative. The appeal of the Khar'kovites met with response from the collectives building the facilities of the Gomel' Agricultural Machinery Production Association [PO Gomsel'mash], which organized model-showcase construction, the Volgograd Motor Plant, the Syzran' Agricultural Machinery Plant, and other enterprises. Owing to the sweeping competition, the project start-up program for the first half of this year was completely fulfilled.

At the same time, we are lagging behind in building a number of projects. The laggards include those building the Novo-Solikamsk Potassic Plant (Trust No 8 of the Main West Urals Construction Administration [Glavzapaduralstroy]), the facilities of the Cherkassy "Azot" [Nitrogen] Production Association (Cherkassy Chemical Construction Trust), the Yefremov Glucose and Molasses Plant in Tul'skaya Oblast (Yefremov Chemical Construction Trust [Yefremovkhimostroy]), and the Volgograd Tractor Plant (Volgograd Metallurgical Construction Trust [Volgograd-metallurgstroy].

[Question] How is the economic mechanism of construction being improved, and what is being done to convert to evaluating performance according to end-results?

[Answer] During the current Five-Year Plan period, for the first time in economic planning practice, national income is scheduled to grow at a faster rate than capital investments. This dictates a fundamentally new approach to the allocation of capital outlays and organization of construction. Today the focus must be placed on improving the meshing of capital construction with the material-technical resources and possibilities of the construction and installation organizations.

Builders have advanced to a qualitatively new stage in connection with the conversion to the planning of operations on the basis of marketable output. All the construction organizations of the USSR Minpromstroy have been converted to this kind of planning and clearing of accounts with customers as of 1 January 1981. Industrial enterprises have converted to planning labor productivity according to normative net output.

All this has improved the situation on the construction sites. The degree of the concentration of resources on projects scheduled for completion has increased, as has the rate of the activation of fixed assets, and standard construction schedules are being shortened. In 1982, compared with 1980, the number of projects under construction by the USSR Minpromstroy decreased by 1,700.

The overall system of construction management is being improved. Plans exist to introduce the twin-link "Union ministry-construction administration" system in the North Ossetiya, Checheno-Ingush, Dagestan, and other construction administrations. More than 80 percent of the organizations will operate on the basis of the triple-link system.

The lower-echelon organizations are being strengthened and the network of production associations is being developed along with the specialization and co-production of work collectives. In particular, the number of mobile special-purpose trusts has increased from six in 1965 to 27 at present.

Preparations have been completed for converting construction organizations to the planning of labor productivity according to the inducator of normative nominal net output [NUChP]. The Belorussian SSR Minpromstroy, the Glavomskpromstroy, the Main Oka River Construction Administration [Glavpriokstroy], and the Orel and Kaluga construction administrations are preparing to convert to such planning. A new form of "passports" has been introduced for all construction and industrial organizations with the object of obtaining clear figures on the work potential of the collectives and improving planning.

The conversion to planning based on marketable construction output requires changes in the system of organizing plans. In particular, all aspects of every individual construction project have to be analyzed in greater depth. Complete cost estimates of projects in the final stage of completion, sections, and complexes of facilities have to be clearly determined. Hence, the plan of every customer ministry should clearly distinguish between the funds allotted for capacity activation and those allotted for the initial stages of new projects. In this connection, it is also expedient to organize the planned monitoring of uncompleted construction in every oblast, kray, and autonomous and Union republic.

To meet the requirements of the new economic principles, it is necessary to revise operatively the Regulations Governing Subcontracting Agreements as well as the Financing Regulations, and to include in legislation and regulations the provision that all participants in the construction process bear equal responsibility. At present it is the prime contractor [alone] who bears the responsibility [for construction] and sustains losses.

A major role in construction is played by long-range targeted programs. There now operate 12 such programs in the USSR Minpromstroy: "Management and Economics," "Material Resources," "Personnel," "Research," "Quality," "Construction Industry," "Prefabrication," "Complete Sets," "Continuity," "Subcontracting," and others. The program for introducing the brigade-subcontractor system is particularly broad. The USSR Minpromstroy performs more than 54 percent of all construction operations by this method.

[Question] What has been and is being done by the Ministry's collectives as regards the rational utilization of raw-material, fuel, energy, and other material resources?

[Answer] To solve this important problem, the comprehensive targeted program "Conservation and Rational Utilization of Material Resources During the Years 1981-1985" has been drafted and is being implemented. To a large extent, the conversion of construction to continuous-flow erection of facilities enables us to conserve manpower and material resources. To this end, we will make broad use of modular flooring, centrifuged reinforced-concrete pillars, KZhS-type slabs and shells, and lightweight structural metal components.

Centrifuged pillars, which save 35 kg of steel and 150 kg of cement per cubic meter, will be used on a mass scale in the construction of single- and multi-storey industrial buildings.

We derive considerable savings from using new types of porous aggregates. In 1981 the plants of the Belorussian SSR Minpromstroy produced more than 500,000 cu m of structural components from lightweight concretes, and saved about 200 tons of metal.

On housing and cultural-communal construction projects considerable savings are derived from the erection of buildings from completely prefabricated modular units. Each year the USSR Minpromstroy releases for occupancy 200,000 sq m of dwelling and cultural-communal area based on such units. In Krasnodar, Minsk, and Kremenchug we are erecting modular-panel buildings with 70-percent degree of offsite prefabrication.

[Question] The editors of EKONOMICHESKAYA GAZETA organized monitoring posts at a number of construction sites, including those at the Tobol'sk Petrochemical Combine and the Tula Combine Harvester Plant. What is the situation with these projects?

[Answer] In April of this year we examined at the collegium the question of measures to secure the construction of facilities at the Tobol'sk Petrochemical Combine. A corresponding order has been issued. In the first half of the year 2,200 persons were assigned to this project and in the second half an additional 800 persons will arrive there.

In the first half of this year the volume of construction and installation operations performed was 25 percent greater than in a like period last year. The first rectification column was installed at the central gas-fractionating facility. At the Tula-North Construction Base [TSB--Severnaya] the assembling of two isothermal reservoirs and the second-stage system of overhead delivery pipes has begun. The work on facilities of construction-industry bases has been launched on a broad front.

But the situation remains difficult. The plan for the first half of the year was fulfilled only 90 percent. The reason: unsatisfactory deliveries of building materials. The project is not being adequately supplied with local materials by the Tyumenskaya Oblast ispolkom, and with rolled metal by the organs of the USSR Gossnab.

Much of the fault also belongs to the prime contractor--the Tobol'sk Industrial Construction Association [Tobolpromstroy]. There is a high personnel turnover at that association owing to a shortage of housing. Currently an intensive program for housing construction has been drafted. Within the current Five-Year Plan period this problem will be solved.

Now about the Tula Combine-Harvester Plant. Its expansion and modernization also are beset by quite a few shortcomings. The plan for the first half of the year was fulfilled only 85 percent. But this is not the fault of the prime contractor--the Tula Industrial Construction Trust [Tulpromstroy]. The Trust turned out to be overburdened with assignments, and it is short of manpower and material resources. This is the reason for the sluggish pace. And besides, unfortunately, the customer is obstructing progress. As late as last May the All-Union Combine-Harvester Production Association [VPO Soyuzkombaynprom] was supposed to release land for the erection of the welding and assembly building. But so far this has not been completely done. By that period, too, the All-Union Association for Tractor Design [VO Soyuztraktorproyekt] was supposed to provide the missing blueprints for the construction part of the welding and assembly building. But these blueprints still have not arrived either.

The Tula city CPSU committee examined the situation on the construction site. The slack workers were subjected to the penalties they deserved.

By now the Glavpriokstroy has drafted measures to overcome the lag in construction. The new schedule provides for catching up with the omissions in the third quarter of the year.

In conclusion, I wish to extend my greetings to all builders on the occasion of the Day of the Builder and wish them an honorable fulfillment of the plans for 1982 and the Five-Year Plan as a whole.

1386
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COSTING INDICATORS IN CONSTRUCTION DISCUSSED

Moscow EKONOMIKA STROITEL'STVA in Russian No 6, Jun 82 (signed to press 19 May 82) pp 62-65

[(Correspondence School for Accounting Clerks: Lesson 12) Lesson by subdepartment head A. D. Bobrov, USSR Gosstroy Department of Estimate Norms and Price Formation in Construction: "Procedure for Converting Price Lists, Consolidated Estimate Norms and Using Consolidated Construction Cost Indicators"]

[Text] In accordance with the decree on changing construction over to new estimate norms and prices as of 1 January 1984, the price lists for the construction of buildings and structures and the consolidated estimate norms (CEN) currently in effect must be recalculated.

This work must be done on schedules which ensure the preparation of estimate documentation at least for the work volume which must be done in 1984, that is, consolidated estimate norms must be converted prior to 1 January and price lists -- prior to 1 April 1983.

One of the basic requirements of converting price lists and CEN's is that the layout-module and structural resolutions previously adopted in plans remain unchanged.

In order to avoid unproductive expenditures, we should select for conversion the indicated estimate normatives, bearing in mind in this regard that price lists and CEN's compiled following standard, repeatedly-used, economical individual plans and standard plan resolutions which will not be in force after 1 January 1983 need not be converted. If the construction of projects whose estimated cost has been determined using price lists and CEN's not subject to conversion has not been completed by 1 January 1984, the carryover estimated cost must be determined on the basis of unified regional and individual cost sheets and cost sheets for equipment installation.

Institutes developing these normatives select for conversion price lists and CEN's based on assignments from the corresponding ministries, client departments and union republic gosstroys.

The lists of selected price lists are agreed to by the agencies which have approved these normatives (or under procedures established by them) and the CEN's are agreed to by the USSR Gosstroy's Construction Estimate Norms and Price Formation Department.

Price lists and CEN's must generally be converted by the planning organizations working out these normatives. In individual cases, the appropriate ministries, departments and union republic gosstroys can decide to entrust the conversion of price lists and CEN's to other planning organizations. If so, the price list and CEN developing institutes are obligated to transmit to them all substantiating calculations for their temporary use.

Price lists and CEN's intended for compiling local building and structure construction estimates for production facilities, putting in outside utilities and other types of construction, excluding housing and civil-engineering construction, are converted directly.

Price lists for the construction of housing and civil-engineering facilities are generally converted using coefficients or indexes which define a "support" plan for each section of the estimate. One plan for a specific series or group of building plans with similar layout-module and structural resolutions, taken into account in the price list, is used for this. Indexes express the relationship of direct estimate expenditures for each section of the "support" plan estimate to analogous expenditures as determined using estimates for other plans in the series. The planning organization entrusted with converting the price lists groups the plans and chooses the "support" plan.

The grouping of plans by the institute converting the price lists and the choice of a "support" plan are coordinated with the contractor ministry or subcontractor construction organization which previously agreed to these normatives.

Indexes based on "support" plan estimates can be determined in two ways.

In the first method, the "support" plan estimate is converted based on new unified regionunit rates, equipment installation prices and estimated prices for components, items and materials which are to be instituted as of 1 January 1984. We then determine the relationship between the new cost under each section to the cost as calculated in prices instituted on 1 January 1969. This ratio is then the index, which is extended to corresponding sections of the estimates for other plans in the series (group).

In the second method (which can be used if zonal unit rate handbooks have not yet been approved when the conversion is done), resources are selected based on element estimate norms from "support" plan estimates for each section (in accordance with the distribution of expenditures used in the price list for parts of buildings and types of work). Auxiliary materials (oakum, nails, putty and others) are not included.

Regardless of the price list conversion method used, these normatives must delineate for each section: basic wage, cost of operating machinery and normative nominal net output.

Transfer indexes for "support" plan resources are determined next.

The materials dealt with in each selection section are rated using corresponding handbooks of estimated prices for materials, items and components in effect since 1 January 1969 and those to go into effect on 1 January 1984.

The wage and machinery operating expenditures are calculated using handbooks for normative nominal net output delineated in the corresponding price lists. Coefficients are used to convert these indicators.

The wage level is determined using coefficients developed by the USSR Gosstroy NIIES [Scientific Research Institute of Construction Economics] (and will be communicated to the ministries and departments concerned).

The cost of operating machinery is determined in the new estimate norms and prices using coefficients put forward in the "General Portion of Element Estimate Norms, Part 4," SNiP [Construction Norms and Regulations], which will go into effect on 1 January 1984.

The overall form of the transfer index is expressed by the formula

$$K_c = \frac{З_п \cdot K_з + Э_м \cdot K_м + МЦ\ 1984}{З_п + Э_м + МЦ\ 1969},$$

where K_c is the index of change in direct expenditures for an estimate section;

$З_п$ is the wage used in estimate normatives instituted on 1 January 1969;

$K_з$ is the coefficient (index) of change in the wage level;

$Э_м$ are machinery operating expenditures used in estimate normatives instituted on 1 January 1969;

$K_м$ is the coefficient (index) of change in the level of machinery operating expenditures;

МЦ 1984 are total expenditures on materials in estimated prices instituted on 1 January 1984;

МЦ 1969 are total expenditures on materials in estimated prices instituted on 1 January 1969.

The equipment installation cost in the price list of a "support" plan is converted using handbooks of equipment installation rates effective as of 1 January 1984.

Price lists which cannot be combined into groups are converted directly. Examples of transfer coefficient calculations (hypothetical data) for the "finishing work" and "walls" sections using the resources selection based on the estimate substantiating the price list are given in Tables 1 and 2 [following pages].

Expenditures on the acquisition and installation of equipment and decorative fixtures included in price lists for the construction of public and administrative buildings are determined by converting in accordance with USSR Gosstroy Instructions No 76-D of 29 December 1981. The consolidated construction cost indicators (CCCI) worked out in the norms and prices instituted on 1 January 1969 and the consolidated estimate norms intended for compiling local estimate calculations are not converted.

When determining the calculated cost of construction (renovation, expansion) in the new estimate norms and prices in plans for developing and distributing productive forces by economic region and union republic and when compiling local

Table 1

Example

(calculating the transition factor for the "finishing work" section)

№ п. п.	(20) Наименование ресурсов	(21) Единица измерения	(22) Количество	Цены или коэффициенты в нормах (23)		Всего затрат в нормах (24)	
				1969 г.	1984 г.	1969 г.	1984 г.
1	Заработная плата	(27) р.	1300	1	1,05	1300	1365
2	Эксплуатация машин	(28) кг	166	1	1,12	166	186
3	Белила цинковые	кг	162	0,85	0,92	138	149
4	Гвозди штукатурные	кг	8	0,2	—	—	—
5	Гипс	(29) т	0,1	19,8	—	—	—
6	Дрань штукатурная	тыс (30)	4,6	5,03	—	—	—
7	Краски тертые	кг	27	0,49	—	—	—
8	Краски сухие	кг	19	0,52	—	—	—
9	Клей малярный	кг	10	0,38	—	—	—
10	Купорос медный	кг	6	0,15	—	—	—
11	Мел молотый	кг	261	0,02	—	—	—
12	Мыло хозяйственное	кг	7	0,45	—	—	—
13	Олифа	кг	188	1,76	1,85	331	348
14	Плитки керамические рядовые	(31) м²	990	4,2	4,7	4158	4653
15	Раствор известковый	(32) м³	18	12	13	216	234
16	Раствор цементно-известковый	м³	2	13	—	—	—
17	Раствор цементный 1:4	м³	16	14	14,5	224	232
18	Сетка проволочная тканая	м²	260	1,12	1,3	291	338
19	Прочие материалы	р.	60	1	1,15	60	69
	(25) Итого	р.				6884	7505

(26) Индекс $K = \frac{7505}{6884} = 1,09$

Key:

1. Wage
2. Machinery operation
3. Zinc white
4. Lathe nails
5. Gypsum
6. Plastering lath
7. Ground pigments
8. Dry pigments
9. Paint sizing
10. Blue vitriol
11. Chalk powder
12. Hand soap
13. Drying oil
14. Commercial-grade ceramic tile
15. Lime mortar
16. Lime-cement mortar
17. Cement mortar, 1:4
18. Wire screen cloth
19. Other materials
20. Resource
21. Unit of measure
22. Quantity
23. Prices or coefficients in norms
24. Total expenditures in norms
25. Total
26. Index
27. Rubles
28. Kilograms
29. Tons
30. 1,000
31. Square meters
32. Cubic meters

Table 2

Example
(calculating the transition factor for the "walls" section)

№ п. п.	(16) Наименование ресурсов	(17) Единица измерения	(18) Количество	Цены или коэффициенты в нормах (19)		Всего затрат в нормах (20)	
				1969 г.	1984 г.	1969 г.	1984 г.
1	Заработная плата	(24) р.	300	1	1,05	300	315
2	Эксплуатация машин	р.	250	1	1,12	250	280
3	Бревна строительные IIIс 140—240 мм	(25) м³	0,3	22,3	—	—	—
4	Войлок строительный	м² (26)	4	0,92	—	—	—
5	Глина обыкновенная	м³	1,15	4	—	—	—
6	Доски IIIс 40 мм и более	м³	4	25	28	100	112
7	Кирпич глиняный	(27) тыс. шт	45	27	32	1215	1440
8	Крепления металлические	(28) т	0,6	215	245	129	147
9	Песок	м³	2	3,5	—	—	—
10	Плиты облицовочные	м²	3	17	19,2	51	58
11	Раствор цементно-извест. 25	м³	30	13	14	390	420
12	То же, 50	м³	10	14	15	140	150
13	Цемент 200	т	0,3	18,5	—	—	—
14	Шлак	м³	40	3	3,2	120	128
15	Прочие материалы	р.	10	1	1,15	10	11
	(21) Итого	р.	—	—	—	2705	3061

(22) Индекс $K = \frac{3061}{2705} = 1{,}13$

(23) Примечание. Прочерк в графе 6 означает, что указанные материалы в расчет не принимаются ввиду незначительной их стоимости.

Key:

1. Wage
2. Machinery operation
3. IIIs 140-240mm construction beams
4. Construction felt
5. Common clay
6. IIIs 40mm and larger boards
7. Clay brick
8. Metal fasteners
9. Sand
10. Sheathing
11. #25 cement-lime mortar
12. #50 cement-lime mortar
13. #200 cement
14. Cinders
15. Other materials
16. Resource
17. Unit of measure
18. Quantity
19. Prices or coefficients in norms
20. Total expenditures in norms
21. Total
22. Index
23. Note: The dashes in column 6 signify that the indicated materials have not been used in the calculation in view of their insignificant cost.
24. Rubles
25. Cubic meters
26. Square meters
27. 1,000 units
28. Tons

and project estimate calculations, these normatives are used with indexes of change in the estimated cost of construction-installation work and other expenditures. These indexes are developed in accordance with USSR Gosstroy "Instructions on Simplified Procedures for Recalculating Carryover Estimated Cost of Construction-Installation Work and Other Work and Expenditures (Including Expenditures on Deep Petroleum, Gas and Thermal Water Exploratory and Operational Drilling) By Branch of the National Economy, Branch of Industry and Direction, As Part of Branches on Construction Projects Carried Over to 1984 and Estimated Cost of Construction-Installation Work and Other Expenditures on Construction Projects Being Begun in 1984," which were approved as No 30-D by the USSR Gosstroy on 25 February 1981.

In individual instances, the USSR client ministries and departments and the union republic councils of ministers can decide, when converting and determining the calculated cost of construction (renovation, expansion) using CCCI, to use indexes for directions in the branch.

The equipment cost recorded in the CCCI in estimated prices in effect since 1976 and the new estimated prices going into effect in 1984 can be calculated taking branch indexes into account when determining the calculated cost of construction (renovation, expansion) in the productive forces development and distribution plans for economic regions and union republics. Those indexes are determined as a result of the conversion, using new prices, of the carryover estimated cost of equipment in accordance with the USSR Gosstroy "Instructions on Procedures for Using New Prices to Convert Carryover Estimated Cost of Machinery and Equipment for Construction Projects Carried Over to 1984 and Recalculating the Estimated Cost of Machinery and Equipment for Construction Sites Being Begun in 1984, Whose Estimated Cost Was Approved in 1976 Estimated Prices, and Procedures for Determining Indexes of Change in the Estimated Cost of Machinery and Equipment Not Included in Estimated for Construction Projects Necessary to Recalculate Limits on Capital Investments Allocated to Acquire Machinery and Equipment," approved as No 20-D on 27 February 1981 by the USSR Gosstroy, USSR Gosplan, USSR Ministry of Finance, USSR State Price Committee, USSR Central Statistical Administration, USSR Stroybank and USSR Gosbank. The cost of equipment recorded in the CCCI can also be determined in the above instances using average indexes approved by the USSR State Price Committee for corresponding types (groups) of machinery and equipment.

11052
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CONSTRUCTION

CAPITAL INVESTMENTS IN CONSTRUCTION NOTED

Moscow AGITATOR in Russian No 7, Apr 82 (signed to press 17 Mar 82) pp 34-35

[Article by Candidate of Economic Sciences Yu. Khrakovskiy, chief of a sector of the Scientific Research Institute of Economics of Construction of USSR Gosstroy: "One Percent in Construction"]

[Text] During the 10th Five-Year Plan the amount of construction and installation work came to 343.3 billion rubles. In comparable prices this is nearly 15 percent more than was performed during the Ninth Five-Year Plan and more than during the Fifth, Sixth and Seventh Five-Year Plans taken together.

Not so significant an increase has been outlined for the 11th Five-Year Plan. In conformity with the instructions of the 26th CPSU Congress for the first time in the practice of planning a leading increase of the national income as compared with the increase of capital investments is envisaged. Their amount will increase by only 10.4 percent with an increase of the national income by 18 percent. This makes it incumbent to use every ruble of capital investments more efficiently.

What are the means here? First of all in the composition of the capital investments the proportion of the expenditures on the renovation and retooling of operating enterprises will increase. The proportion of the expenditures on equipment, tools and implements, that is, on the active portion of the fixed capital, will increase.

Accordingly, the proportion of construction and installation work in the total amount of capital investments will decrease to 51 percent as against 54 percent during the 10th Five-Year Plan and 61 percent during the Ninth Five-Year Plan. With allowance made for this circumstance /the amount of construction and installation work as a whole during the 5 years will be only 4 percent more than during the past five-year plan. However, each of them now exceeds 3.4 billion rubles/ [in boldface].

This sum is equal to the amount of construction and installation work when building, for example,

270,000 apartments of average size and average level of provision of amenities,

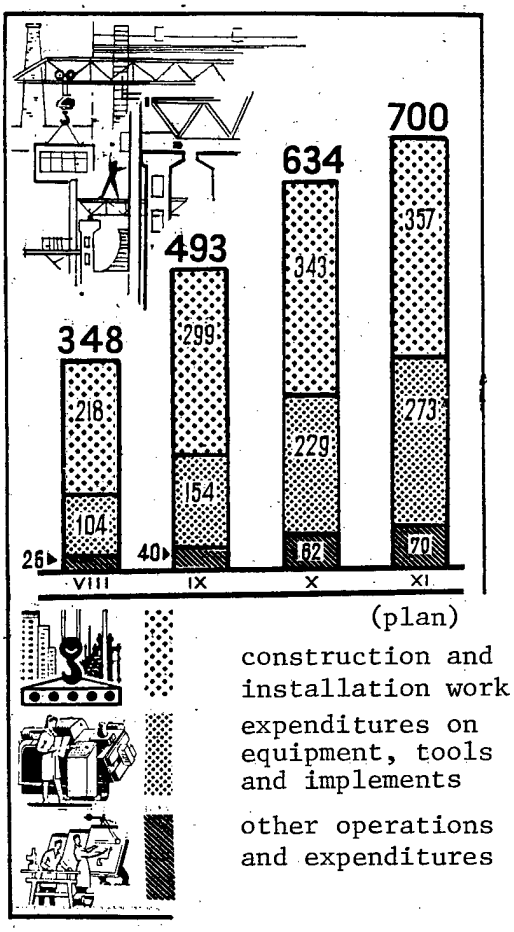
or 7,000 kindergartens with accommodations for 280 children each,

or 90 medium-capacity machine building plants,

or 4,200 km of four-lane highways,

or 160 large poultry factories.

Capital Investments in the National Economy and Their Composition
by Five-Year Plans
(in comparable prices; billions of rubles)



Thus, even /just a 1-percent increase of construction and installation work for the country as a whole comes during the five-year plan to an enormous amount/ [in boldface] and increases the national wealth of the USSR by billions of rubles. But the harm from each percent of the nonfulfillment by construction workers of the plans of the placement of fixed capital into operation is accordingly like that. It is the duty of all construction collectives to ensure the steadfast fulfillment of the plan during each year of the five-year plan and during each quarter of it.

During the Eighth Five-Year Plan the average annual number of personnel employeed in construction and installation work increased by 1.3 million, during the Ninth Five-Year Plan--by 936,000, while during the 10th Five-Year Plan it increased by only 244,000. In 1965 136 workers were required per million rubles of performed construction and installation work, in 1975--only 83 and in 1980--73.

Here is what kind of impact /the increase of labor productivity/ [in boldface] yields in construction. During the past five-year plan it increased by 11 percent, but this was less than was called for by the plan. Now it is necessary to ensure its increase as compared with 1980 by 15 percent, each of which is equivalent to the additional attraction to construction projects of more than 80,000 people, including 65,000 workers. These workers can lay in a year about 4,000 km of gas pipelines or build 2,650 secondary schools for more than 1,000 students each.

By means of the increase of labor productivity, without an increase of the number of workers and even with its slight reduction it is necessary to provide the entire increase of the amount of construction, which has been planned for the five-year plan. This requires the serious improvement of the organization of labor and production at the construction projects, the tightening up of labor discipline, a great sense of responsibility of each construction worker for the assignment matter. It is necessary to put an end to the still significant losses of working time, including due to unauthorized absences from work. The loss for certain reasons or others by each person employed in construction and installation work of just 1 day during the year is equivalent to the loss of the labor of approximately 30,000 people in the course of an entire year.

The increase of labor productivity, while ensuring an increase of wages (during the 10th Five-Year Plan they increased for the workers in construction and installation work on the average from 180.3 to 207.9 rubles), at the same time usually decreases the expenditures of these assets, as well as the overhead and the depreciation of machines and devices per unit of construction output.

However, the main means of /the reduction of the cost/ [in boldface] of construction and installation work is the economy of materials and structural components, the cost of which amounts to more than half of all the expenditures of construction organizations. Every percent of the economy by them of cement, bricks, blocks, panels, metal, glass, lumber, linoleum, paint and other material resources saves during the year more than 350 million rubles. This, for comparison, is a fourth of the total annual material expenditures in the case of the construction of facilities of education and culture, taken together.

To build quickly, economically and on a high technical level--such is the task set by the 26th CEPS Congress. And each person must accomplish it at his workplace.

7807
CSO: 1821/159

CONSTRUCTION

HISTORY OF TOGLIATTI VAZ AUTOMOBILE PLANT TRACED

[Editorial Report] The economics journal of the Siberian Branch of the USSR Academy of Sciences, EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA Nos 1-4, Jan-Apr 1982, carries a four part article by Boris Katzman which traces the history of the Togliatti VAZ automobile plant. Covered in the articles are the selection process, the negotiations with Fiat for the plant, the construction of the plant and the means by which equipment was obtained. The four articles appear in English translation in JPRS 81438, 3 Aug 1982, USSR REPORT: TRANSPORTATION, No 90, pp 1-43.

CSO: 1829/229-A

NEW SOLAR HEAT METHOD ACCELERATES HARDENING OF CONCRETE

Moscow STROITEL'NAYA GAZETA in Russian 11 Jul 82 p 3

[Text] The Laboratory for Methods of Accelerating the Hardening of Concrete of the USSR State Construction Committee's Scientific Research Institute of Concrete and Steel-Reinforced Concrete, the Thermal Physics Research Laboratory of the All-Union Scientific Research and Design Institute for Heat-Engineering Structures, and the Uzbek SSR Ministry of Rural Construction have proposed a new method for accelerating the hardening of concrete by utilizing solar energy.

The treating of products can be accomplished directly in molds or forms. Studies which were carried out have permitted the development of new designs of solar molds and solar forms which are equipped with special sunlight-absorbing and heat-accumulating coatings ["SVITAP"].

As compared with conventional process, the strength of concrete hardened in solar molds at a test facility over a period of 12 hours is four to five times higher, while that of concrete hardened over a period of 24 hours is two or more times as high. In other words, it is possible to remove forms and molds much sooner.

Methods of accelerating the hardening of concrete which are new in principle have been developed on the basis of these solar molds and forms. These methods allow steam curing to be dispensed with for six to seven months of the year and the consumption of energy for heat treatment to be substantially reduced during the remaining period of the year at sites in the southern regions of our country.

CSO: 1821/169

SELECTED ITEMS FROM MASHINOSTROITEL', MAY 1982

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UDC 621.9.06-114-529.002.6

Accelerated Machine-Tool Design Development

Moscow MASHINOSTROITEL' in Russian No 5, May 82 (signed to press 30 Apr 82) p 10

[Article: "Accelerated Rates of Development of New Equipment"]

[Text] Ivanovskiy machine-tool builders have accumulated a great deal of experience in the accelerated development of unique machine tools with preset control and automatic tool replacement. Previously, it took 5-7 years to develop a machine tool (from design to release of a reference lot), and it was an unreliable, obsolete model which reached series production. Specialists at the borer special design bureau at the Ivanovskiy Machine-Tool Production Association imeni 50th Anniversary of the USSR therefore decided, in close cooperation with metallurgists, technologists and tool-makers, to reduce the time involved in developing the technical documentation for processing-center types of machine tools and expanded competition under the slogan "Accelerated Rates of Development of New Equipment, Maximum Return From New Equipment." They proposed an organizationally new approach to machine-tool design. The plant and special design bureau leadership proposed to the ministry that the IR500MF4 be produced in a single year, excluding the process of reaching agreement with the various administrative levels and manufacturing a prototype. To do this, they worked out a PERT network with no in-stages movement of documentation from service to service. The machine tool was broken down into individual major subassemblies whose design was assigned to appropriate departments following schedules coordinated with related departments. The labor-intensiveness of designing each part and subassembly as a whole was carefully calculated in such a way that a technical-draft design was available within a month. Little more than a month was required to draw up the technical design. Technologists and metallurgists worked with the designers. Production workers were attached to the engineering services as well. The base parts were designed and the modelers had already begun their work, so the designers had supplied production with blueprints for the machine tool within three and a half months, and the main base parts had been cast in metal two weeks later. The schedule for assembling the individual subassemblies indicated their labor-intensiveness in norm-hours and anticipated cooperative deliveries of parts, indicating without fail the manufacturing enterprise for the inventory sets if, for some reason, delivery of the primary set would be delayed.

The first processing center, manufactured in one year (from the start of the designing), was submitted to the "Stanki-77" exhibit for display at the USSR Exhibit of National Economic Achievements. And the "Modul'-500" based on it and also exhibited there was equipped with an eight-position storage unit consisting of satellite platforms to ensure continuous operation throughout a shift; it was created in four months (from the start of planning). That same year, yet another processing center was demonstrated at the World Machine-Tool Exhibit in Hannover (FRG). The high technical level of the machine tools developed was confirmed by exhibit certificates of achievement and medals, as well as by the concluding of export contracts.

Somewhat more than two years was needed to design and manufacture the unique IR1600MF4 automatic horizontal borer with preset control and automatic tool replacement (weight -- 180 tons, dimensions -- 20.1 x 6 x 6.9 meters). This machine can process large body parts up to 20 meters long and 3.5 meters high automatically. It is equipped with modern combined NPC systems which ensure the simultaneous control of five coordinates and it has a device for automatically replacing the overhead multipurpose bits.

Specialists have given a high evaluation of the IR320PMF4 processing center developed by Ivanovskiy machine-tool builders. This machine, called the "Malysh" [little one] due to its relatively small dimensions, has almost unlimited possibilities. It can perform any metalworking operations automatically, including turning and grinding. It combines high speed and machining precision of the most complex body parts with maximum concentration of technological operations. Compared with program-control machine tools now being produced, the "Malysh" is three times as productive. Production preparation time when output is being replaced is significantly reduced. This machine tool represents a good basis for improving the structure of equipment being produced in the 11th Five-Year Plan. Remarkably, the "Malysh" was developed in less than a year.

The new design and technological developments by Ivanovskiy machine-tool builders have attracted the attention of specialists in the most varied branches of machinebuilding. A one-day seminar was held at the plant for them in 1980. Chief engineers, technologists, designers and the chiefs of bureaus, departments and independent subdivisions familiarized themselves with the system for developing preset-control machine tools faster. That same year, an interbranch seminar to which 300 people from other cities were invited was also held.

Seven multioperation machine tools whose productivity in certain operations is 20 times higher than in multipurpose equipment were developed and mastered in the 10th Five-Year Plan; the number of operations involved in manufacturing complex parts was reduced to 2-3 instead of the 30-50 with ordinary technology.

The primary organization of the association's Scientific-Technical Society of Machine-Tool Building Industry made a worthy contribution to these successes by actively helping develop the new equipment and providing public monitoring of its introduction. Society members made more significant proposals aimed at developing and introducing as quickly as possible modern machine tools and highly efficient technological processes. They participated actively in socialist competition for fulfillment of plan assignments well and ahead of schedule. They found new ways in which to link association subdivisions, permitting an acceleration of the development of new equipment. The participation of society members in discussions in the development and planning stage did much to facilitate ensuring a high technical level in the machines. The Scientific-Technical Society of Machine-Tool Building Industry primary organization regularly holds contests and inspections which enable it to involve the broad masses in eliminating production bottlenecks, as well as contests to develop inventions.

Comrade L. I. Brezhnev, CPSU Central Committee General Secretary and USSR Supreme Soviet Presidium Chairman, congratulated Ivanovskiy machine-tool builders on their remarkable victory, writing: "The CPSU Central Committee places a high value on your remarkable achievements in developing unique automatic machine

tools...and organizing their series production quickly. This latest equipment will permit raising machinebuilding technology and metalworking automation to a qualitatively new level and will ensure the resolution of pressing tasks of improving production efficiency....

The experience you have accumulated in close cooperation with your clients in the accelerated development of new equipment and your obligations regarding providing production with complete sets of equipment and achieving high equipment efficiency are a good example for all machinebuilders."

UDC 658.511.5:621.9.06-114-329

Processing, NPC Machine Tools

Moscow MASHINOSTROITEL' in Russian No 5, May 82 (signed to press 30 Apr 82) pp 12-13

[Article by Candidate of Economic Sciences Ye. A. Bel'tyukov and engineer S. V. Popov: "Equipping Processing Centers and Machine Tools With NPC (numerical program control)]"

[Text] One direction in which the economic effectiveness of machinebuilding production can be increased is to automate it on a base of the use of highly productive multitool equipment of the processing-center and NPC machine-tool type. Successful resolution of this task is determined in significant measure by the provision of these machine tools with attachments, as well as cutting and accessory tools.

Given the transition from machining parts with multipurpose equipment to the use of NPC machine tools and processing centers, quantitative and qualitative changes are occurring in the equipment of technological machining processes. In the multitool machining of body parts, simplified clamp fittings are used instead of several special expensive adapters. The improved quality, precision and smoothness of the machining and ensuring dimensional stability of all parts in a lot without tool adjustment presupposes especially high demands on tool hardness and wear resistance. This leads to an expanded products list of special cutting tools and a slight increase in expenditures on their manufacture. The role of providing such equipment with auxiliary tools increases significantly. Expanding the list of parts being machined, and especially of complex body parts manufactured at processing centers, depends directly on the availability of boring bars, mandrels, bushings, wedges, stops and other auxiliary tools.

With the introduction of NPC machine tools and processing centers, expenditures on the design and manufacture of all types of accessories as a whole are decreasing. For example, annual accessories production expenditures at the Odessa Precision Machine-Tool Plant imeni 25th CPSU Congress in a sector operating 39 such pieces of equipment have decreased by 49,500 rubles as compared with expenditures on accessories needed to carry out the exact same annual production program if the parts are made on multipurpose machine tools. Nonetheless, overall expenditures on equipping one NPC machine tool, and even more so for one processing center, are rather high, about 3.5 to six percent of its cost.

In order to forestall unnecessary expenditures on equipment, in resolving this task we need to take into account the features of parts design and the technology of their machining, as well as the organizational-technical conditions of specific production. Practice has confirmed the appropriateness of a by-stages approach to equipping machine tools. In the first stage, the equipment is provided with a set of broadly multipurpose fittings and tools whose manufacturing costs are included in the cost of the machine tool. In the second stage, the consumer plant can acquire a rather broad range of specialized tools and attachments in accordance with its own production-technical operating conditions for a separate payment to the machine-tool manufacturing plant. Finally, in the third and concluding stage, the consumer plant completes its special tool requirements at its own tool shop.

Let us examine the structure of equipping the most complex and expensive processing-center type of multitool drill-mill-boring equipment, which is designed for manufacturing multioperation, labor-intensive body parts with a high degree of complexity and precision. Expenditures on the fittings initially part of this equipment, which are included in the wholesale price of the machine tool, are about 1.0 to 2.2 percent of its cost and 35-41 percent of total fittings expenditures. More than half the fittings are supplied on special order for a separate payment, which comprises about 1.7 to 3.9 percent of the cost of the equipment and 59-65 percent of all fittings expenditures. The cost of attachments comprises about 20 percent of all fittings expenditures. Their number is small, generally less than 9-12 per machine tool. Expenditures on manufacturing auxiliary tools reach 40.9 to 61.9 percent of all fittings expenditures, and the number of such tools reaches 85-182 for individual machine-tool models.

Processing centers are provided with sets of 25-29 accessories necessary to adjust and service them, the cost reaching about 18-19 percent of all fittings expenditures for each machine tool. Expenditures on cutting tools in the equipment set reach 20 percent of total fitting expenditures in individual instances. However, it is most expedient to provide machine tools with multipurpose cutting tools obtained from special tool plants and to manufacture special tools at the plant operating the equipment.

It is equally important to study change in the structure of fittings being used in multioperation machine tools for processing body parts. The proportion of expenditures on attachments reaches 13-20 percent of all fittings expenditures for individual machine-tool models, of which 70-80 percent are expenditures on auxiliary tools and about 7-10 percent are expenditures on cutting tools.

Thus, when making up sets of equipment, primary attention must be paid to further increasing the products list and assortment of auxiliary multipurpose tools, whose proportion of the machine-tool equipment set must be increased from 40-60 to 70-80 percent, that is, by 20-30 percent, which will permit a significant acceleration of the introduction of multioperation machine tools and a rise in the economic effectiveness of production. As a result, the changeover of the broad products list of body parts from multipurpose to multioperation machine tools will occur with significantly lower losses and the resultant fuller load on such machines will ensure high rates of production intensification.

Experience shows that there have been insignificant changes in the products list of attachments being supplied with equipment and in the levels of expenditures on their production. Most often, it is necessary to manufacture a small number of simple adjusting attachments or individual devices and design elements in addition to the fittings supplied with the machine tool, which are generally fully used. Actual expenditures on providing production with special cutting tools are increasing. Their products list and assortment are determined by the design and technological features of the parts being machined and their elements, as well as by the necessity of changing the number of individual tool positions in accordance with structural advances in the production program. Moreover, the increased production of this type of tool results from the rapid wear of its cutting elements and, on the whole, by their comparatively brief service life.

The dynamics of equipping a sector of 39 NPC machine tools and processing centers under current production conditions can be judged by the structure of annual expenditures on manufacturing individual types of tools. Thus, annual expenditures on manufacturing all types of fittings by plant tool production facilities exceed 33,500 rubles. Expenditures on manufacturing adapters reach 15.9 percent, auxiliary tools -- 14 percent and cutting tools -- 70.1 percent of all annual fittings expenditures. Thus, primary reliance is placed on the production of cutting tools, whose products list and number are very large. This pattern is also retained when increasing deliveries of cutting tools for NPC machine tools which are manufactured by specialized plants. This is to be explained by the fact that all the technical-technological and organizational features of the machining can be fully taken into account only when manufacturing a significant number of tools of one's own design. Nonetheless, deliveries of cutting tools by specialized plants permit a substantial reduction in overall expenditures on such tools.

Thus, we need to increase 1.3- to 1.5 fold the production of equipment for NPC machine tools and processing centers. In this regard, the production of adapters and auxiliary tools must be done by the machine-tool manufacturing plants and cutting tools -- by the tool plants and tool shops of NPC equipment consumer plants. In order to provide NPC machine tools and processing centers with devices and adapters for adjusting cutting tools and tool assemblies off the machine tool, we need to set up the centralized release of such fittings, since they are multipurpose and can be used in any branch of machinebuilding. The current lack of necessary amounts of such fittings lowers the operating efficiency of this equipment.

Thus, the provision of NPC machine tools with quickly-adjustable, highly durable, rigid and vibration-resistant broadly multipurpose tools and attachments will permit the machining of a diverse products list of complex parts with a high degree of precision, productiveness and efficiency.

UDC 658.588.8

Improving Machinebuilding Equipment Maintenance

Moscow MASHINOSTROITEL' in Russian No 5, May 82 (signed to press 30 Apr 82) pp 18-20

[Article by Candidate of Economic Sciences R. B. Ivut': "Improving Repair Work Planning"]

[Text] Modern production is characterized by the availability of highly productive but complex equipment, automatic and semiautomatic lines. In this connection, questions of maintaining the entire fleet of equipment in proper working condition through repair and prompt servicing have taken on particular urgency. In spite of achievements in the area of repair production, it is still the most backward sector at many enterprises.

As a result, machinery repair and servicing expenditures are unjustifiably high. More than 10 percent of all technological equipment is overhauled annually at machinebuilding enterprises. Repair workers account for approximately the same percentage of all enterprise workers. The level of mechanization of their labor is not more than 15-20 percent.

All this testifies quite convincingly to high expenditures of social labor on equipment repair. The necessity of putting the system of repair production organization into proper order is supported by all economic practice.

Among the many questions connected with increasing the effectiveness of machinery and equipment repair at machinebuilding enterprises, an important place is occupied by improving the planning and recording of repair production.

A majority of the enterprises use for repair production planning the methods and normatives put forth in the standard PPM [planned preventive maintenance] provisions, "Unified System of Planned Preventive Maintenance and Efficient Operation of the Technological Equipment of Machinebuilding Enterprises." These provisions are based on a system of periodic equipment repair. Many years of experience in using this system in industry have confirmed its correctness, that is, the fact that there is a definite dependence of number of hours the equipment has been in use on amount of repair work, generating structurally identical, repeating cycles.

However, the practical work experience of repair services at many machinebuilding enterprises in our country testifies to the fact that many of the normatives recommended by the PPM system are obsolete and that some of its provisions require adjustment.

Analysis has shown that the methods of planning based on repair-complexity units (RCU) used in the PPM system have a number of substantial shortcomings. For example, they do not fully take into account the level of material-labor expenditures as a function of equipment repair-complexity. Thus, under these provisions, expenditures on materials are given in percentages of basic wages and labor expenditures are given on the basis of average worker rate categories. Material expenditures are seven times higher for large and especially repair-complex metalworking equipment than for small and average-size equipment, but labor expenditures are 1.5-fold higher.

However, studies we made of the dependence of material expenditures on average repair-complexity category at automotive and tractor-building enterprises showed that the material expenditures level factor is not a constant value (as is anticipated by the PPM system), even for low and average repair-complexity metalworking equipment, but varied from 1.0 to 4.5. Neither is it constant for other types of equipment of varying complexity.

The amount of repair work, labor and material expenditures depends both on the composition and on the structure of the equipment fleet by type, age and load; but the normatives for labor expenditures per unit of repair complexity do not take this into account.

Analysis shows that the net cost of overhauling one unit of repair complexity (1 RCU) of machine tools, for example, is 1.4- to 1.9-fold lower than for forging-pressing, foundry and lift-transport equipment. There is a discrepancy between repair complexity and its cost. Thus, whereas the average repair complexity of forging-pressing equipment is 109 percent the repair complexity of machine tools, expenditures on repairs are significantly higher (187 percent) This results primarily from dissimilar levels of expenditures on materials. Thus, these expenditures are 3.4- to 8.5-fold higher when overhauling forging-pressing equipment than expenditures on repairing machine tools; foundry equipment -- 1.8- to 11.4-fold higher, and PTO [lift-transport equipment] -- 2.3- to 3.3-fold higher.

The different cost of materials for individual types of machinery is to be explained by the fact that the parts being replaced and repaired have different dimensions and, consequently, dissimilar materials-intensiveness. The PPM system anticipates that the repair complexity of individual types of equipment increases disproportionately to the weight of the machines, since the repair-complexity category takes into account only the labor-intensiveness of repairs.

The age structure of the machinery fleet exerts a significant influence on material and labor expenditures and on the repair and servicing of equipment. A study of material-labor expenditures on major overhauls as a function of the age of model 1712 and 1722 hydraulic copying lathes, using initial data collected between 1975 and 1980 in the mechanical repair shop of the "Minsk Tractor Plant imeni V. I. Lenin" tractor-building production association, showed that these expenditures are 30-40 percent higher for machines more than 20 years old than similar expenditures for machines less than five years old. At the same time, the PPM system recommends that the normatives for all types of equipment more than 20 years old be increased by only 10 percent.

The PPM system recommends that repair intervals be defined in hours of equipment operation when drawing up the annual PPM schedule-plan. However, a majority of enterprises use repair intervals in months, that is, they draw up repair plans and schedules without considering the time the equipment will actually be operating. This generally leads to an overstatement of planned repair work volumes. In order to determine the correct repair intervals, we need to take into account machine time, and not simply the time the machine has been operated (to this end, we should use special AKRS-3 apparatus to take into account separately the machine time and the overall time of machine operation).

It has become necessary to adjust the repair labor-intensiveness normatives recommended by the PPM system 15 years ago. The experience of the leading enterprises testifies to the fact that these normatives turn out to be overstated if repairs are properly organized.

For example, the time normatives per RCU of major overhaul for all types of equipment at the Minsk Tractor Plant imeni V. I. Lenin are 80 percent of the PPM

normatives; for the Minsk Automotive Plant, they are even lower -- 60 percent. The time normatives for other types of repair are in approximately the same ratio.

We need to note one other important circumstance as well. The PPM system fails to provide precise recommendations on planning and performing equipment servicing, resulting in this type of work's accounting for up to 40-50 percent of all repair work. In this regard, the experience of the Volga Automotive Plant deserves attention, primary attention being paid there to planned inspections, lubrication and equipment cleaning. This plant also uses shorter inspection intervals. This has significantly increased the reliability of equipment operation and reduced unplanned down time. One characteristic feature is that this plant uses the manufacturer's recommendations on equipment operation, servicing and repair, as well as the experience accumulated at the plant in its operation. These materials have been used to establish both the length of the inspection intervals and the types of work done during these inspections. Servicing is done on the basis of job authorizations made by the computer center in accordance with normed cycles for the week for each repair brigade. The computer uses completed job authorizations to record work done and labor expenditures on it.

A number of enterprises and organizations are currently engaged in developing and introducing new forms of equipment servicing and repair organization, as well as leading planning methods. One such effort has been the regulated equipment servicing (RES) system developed by Belorussian Polytechnic Institute and introduced at the Minsk Automotive Plant. The RES system anticipates inspections, planned repairs, cleaning (washing) and lubrication (oil changes). This system is inseparably linked to major overhauls, which are planned using the PPM system in use at branch enterprises (with adjustment of the cycle length and material-labor expenditures normatives for this type of work), but ignoring intermediate repairs. Experience has shown that retaining intermediate repairs in the repair-cycle structure does not have any adequate economic substantiation. In practical enterprise activity, the division of repairs connected with restoring base surfaces into intermediate and major repairs turns out to be very arbitrary; it is practically impossible to define a precise boundary between them.

Moreover, the fact that intermediate repairs are financed from two sources, depreciation deductions and current production expenditures, makes it hard to correctly record expenditures on intermediate and major repairs. The presence of intermediate repair in the cycle structure also prevents us from establishing proper interrelationships among plants producing equipment and the numerous enterprises operating it.

We need to note one other circumstance. At present, the structure of the equipment being produced is being improved through the outstripping release of NPC [numerical preset control] machine tools, heavy-duty, high-precision and single-purpose machine tools and presses, as well as by significantly increasing the release of special machine tools and multipurpose automatic lines adjustable for various part sizes. One of the main operating requirements of such equipment is that it be broken down as seldom as possible, since restoring the adjoining subassemblies and parts to their initial precision is a very labor-intensive process. By increasing the reliability and durability of the parts and subassemblies used, the new equipment has a longer parts service life, including for

base parts, than equipment previously produced. We consequently can and must eliminate intermediate repair from its repair-cycle structure, replacing it with an increased number of mandatory between-repair inspections. Thanks to their prompt elimination of small problems, frequent inspections significantly reduce equipment down time.

These considerations, which have repeatedly been confirmed by experience, permit the conclusion that, for many types of modern equipment, the repair-cycle structure needs to be changed by eliminating intermediate repair, as well as, in view of the specifics of large-scale flow-line production at machinebuilding enterprises, shifting the center of gravity from repairs to equipment servicing.

And that is precisely what they did at the Minsk Automotive Plant in working out the RES system. In order to simplify the planning process, repair work done with the same frequency was combined into separate complexes in this system; they are conventionally designated MS (monthly servicing), I_1 (first inspection), I_2 (second inspection) and RR (regulated repair).

The plant draws up annual RES schedules for the shops and for the entire facility as a whole. The types of work are put down by week for the year. This schedule also includes equipment lubrication and cleaning. The annual schedule of planned repair work is compiled on the basis of "RES Cycle Charts" which indicate the frequency with which jobs are done under the system, an equipment number and code, job description and labor-intensiveness. When compiling the schedule, they anticipate even distribution of total labor-intensiveness by week. The time for which equipment is stopped for work under the RES system is coordinated among all subdivisions.

Monthly servicing is ordinarily done by basic-production workers, while RES work and routine repairs are done by specialized brigades manned by highly skilled repairmen capable of carefully and objectively evaluating the technical condition of the equipment and revealing opportunities for continuing to operate it or making routine repairs promptly.

The previous structure has been replaced by a new one in which small and intermediate repairs have been eliminated and two types of inspection (I_1, I_2 and regulated repairs) have been included for machine tools weighing up to 10 tons and produced prior to 1967. Similar repair-cycle structures have also been developed for machine tools produced after 1967, also considering their weight. The frequency with which RES work is done also depends on the type of equipment, its complexity, age, load, and so on (regulated repairs are made, on average, in 52-55 weeks, I_2 in 13-15 weeks, I_1 in 4-6 weeks).

The RES system introduced at the Minsk Automotive Plant turns out to be advantageous both technically and economically. For example, as a consequence of the more frequent inspections, the number of emergency equipment malfunctions has decreased and the length of the repair cycle has increased. The labor-intensiveness savings per unit of repair complexity per cycle is nearly 50 percent that of the previous cycle in the new structure.

Continued improvement in the effectiveness of using the PPM system in machine-tool building industry and lowering material-labor expenditures on equipment repairs can be assisted by:

-- perfecting the system of planning, recording and reporting forms of documentation and reducing them to a unified initial data base for planning;

-- drawing up a PPM schedule-plan with consideration of equipment type, complexity, age and load (machine operating time); when calculating duration of repair work, consideration needs to be given to data on actual equipment condition, as well as to accumulated information on the service life of individual machinery parts and subassemblies; physical (products list, in actual units and RCU), labor (labor-intensiveness in norm-hours), cost (normative net output, in 1,000 rubles) and quality (proportion of repair work rated "good" and "outstanding") indicators should be used for planning repair work volume;

-- materials expenditures planning should be done not in percentages of the basic worker wage (as is recommended by the PPM system), but on the basis of norms in physical terms and in terms of actual materials cost, also with consideration of data on equipment wear;

-- developing intraplant price lists for basic spare parts manufactured in the repair service, as well as prices for all work done by the chief machinist's service;

-- periodic adjustment and substantiation of all normatives connected with equipment repair and servicing;

-- extensive use of computers in planning, recording and reporting work done;

-- use of experience in organizing, planning and managing repair production by the country's leading enterprises (VAZ [Volga Automotive Plant], ZIL [Moscow Automotive Plant imeni I. A. Likhachev] and others).

Perfecting the PPM system is a complex task which cannot be resolved by individual enterprises. It has therefore become necessary to generalize experience in organizing equipment repair and servicing in all branches of industry and to work out centrally new normative documents for enterprises which take into account the present status and level of development of industrial equipment.

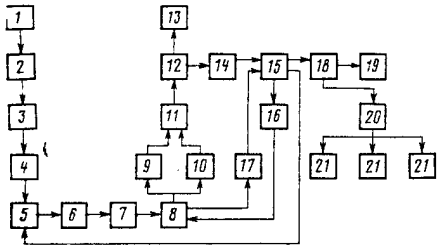
UDC 621.9.06.529:658.51

Machine-Tool Control Programs

[Article by Engineer B. A. Dmitrichenko and Candidate of Technical Sciences V. A. Yevstratov: "Technological Preparation of NPC (numerical preset control) Machine Tools"]

[Text] The necessity arises, in the technological preparation of NPC machine tools for operation, of developing control programs (CP). The overall shortcoming of the processes of preparing, adjusting and monitoring CP's is the high time expenditure and the fact that manual operations are involved. When preparing CP's, labor productivity is significantly improved when the SAP "Kontur" programming automation system using the "Minsk-22" and "Nairi 3-1" computers is used. One important condition for the extensive use of the "Kontur" SAP [programming automation system] is the continuity of its input language with methods of preparing data relative to manual methods of preparing CP's.

The drawing [following page] is a structural chart of the development, derivation and use of CP's for NPC machine tools. As is evident from the chart, the



Key:

1. Production schedule
2. Shop technological bureau
3. OGT [chief technologist's department]
4. CP development schedule
5. CP development bureau
6. Initial data preparation (operational sketch, flow chart, data coding for computer)
7. Keypunching initial data
8. Translating CP to computer using the "Kontur" SAP
9. Output: punched tape No 1
10. Output: punched tape No 2
11. KSU-1M monitoring
12. UKP-1M monitoring
13. Coordinate-graph monitoring
14. CP monitoring
15. Results analysis, check of CP geometric and technological parameters, adjustment of initial data
16. Decision to have the computer put the CP on a punched tape
17. CP printout
18. Output: CP punched tapes and doubles
19. Recording CP control copy in external computer memory
20. Shop records
21. NPC system

CP check after translation to computer is done along two lines: for experienced, skilled programmer-technologists, the program is monitored after printed out on an ATsPU-128; for mid-level specialists and novices -- after checked on the UKP-1M and coordinate-graph.

After the enterprise has NPC installations with eight-track punched tapes in an ISO-7 bit code (N22-1M, N33-1M and others), the standard "Kontur" SAP translator is used with the N22-1M and N33-1M post-processors. In view of the fact that the time involved in translating the CP for computer is slight (less than five minutes), we recognize the appropriateness of repeating the CP output and subsequently comparing them on a KSU-1M. This enables us to eliminate errors due to malfunctions in keypunching on PL-150 output installations and to improve punched-tape quality for NPC machine tools.

The introduction of the "Kontur" SAP at an enterprise and the use of a primary and back-up computer enable us to automate 90 percent of the CP mathematical

preparation. Eighty percent of the CP's at an enterprise are developed by computer. Thanks to CP preparation automation and improved work organization in their development, the program preparation quality coefficient (ratio of usable programs to the total number developed) has reached 4:5. Use of the "Kontur" CAP enabled us to lower programming volume and costs 1.7-fold and to raise by 30-40 percent the labor productivity of programmer-technologists by reducing CP preparation time. Use of the "Kontur" SAP is especially effective when preparing CP's for machining complex parts. A CP translation using the "Kontur" SAP can be set up at the enterprise computer center for other branch enterprises as well. The enterprise computer center then becomes a cluster center and uses computers to calculate 3,400 CP's for NPC machine tools.

Programmer-technologists are specializing to develop CP's for individual NPC machine-tool groups and models. Each CP prepared for processing is checked out and verified by programmer-technologists and specially assigned trouble-shooters on machine tools and is transferred to the shop with a document authorizing introduction. The technical documentation and the CP are kept in the shops. Control copies of the programs and initial data for machined parts are kept in the enterprise computer center. The technological-calculation charts are kept in the CP preparation bureau attached to the OGT. The procedure for developing changes in technological processes and CP's is stipulated in a special provision. Punched-tape duplication and control copy printout distribution are done by the computer center in accordance with shop technologist applications. The constant increase in NPC machine-tool load normatives and the comparatively large number of machine tools being introduced demand an increase in the rates of increment in CP's.

An analysis of the factors delaying an increase in the rates of CP development shows that, in spite of the advantages of using the "Kontur" SAP, CP preparation still requires considerable time. One of the most complex questions in this regard is the monitoring and check-out of prepared programs. Errors in selecting technological parameters, in keypunching, and the influence of other random factors leads to the necessity of repeatedly adjusting CP's. At the same time, it is known that the "Kontur" SAP system operates in such a way that computer program translation proceeds to the first error. If several errors have been permitted, the process of obtaining a finished CP is delayed due to repeated corrections.

Experience shows that, along with the use of the "Kontur" SAP, it is appropriate when preparing short (up to 50 frames) programs to use manual programming. Experience has revealed the necessity of implementing the following measures:

-- development of precise flow charts indicating the sequence and type of machining, blank orientation, tool and attachment codes and positions, a coordinate correlation of parts relative to the machine tool platform, a corrector code, amount of correction, and so on, for each CP;

-- transmission of printouts for each CP from the computer alphabetic-digital printer to the records of a given shop, making it easier to search for needed frames and check machine tools during repairs;

-- standardizing "zero-sets" for machine tools when all parts are installed from a single "zero-set." This negates the specific adjustment features of each NPC machine tool, improves trouble-shooting effectiveness and reduced nonproductive time losses;

-- work planning: development and introduction of CP's, start-up and adjustment work, machine-tool servicing and repair;

-- introducing into parts-machining CP's (with machine times of more than 1.5 hours) a support-point coordinate in front of specific frames which would permit, in cases of accidental malfunction, machining of the parts not from the beginning, but from the support point in front of the frame in which it was interrupted. This permits improved labor productivity when machining parts which are complex in shape;

-- concentrating the necessary set of technical means for efficient CP preparation, calculation and monitoring in the bureau in which they were prepared. The use of such means in a computer center, rather than in the CP preparation bureau, leads to significant losses of time in making various changes, as well as in delivering punched tapes to and from the computer center from NPC machine tools, especially when the enterprise subdivisions are scattered over a large area.

In order to improve the organization of CP recording in their preparation bureaus and in the shops, card files of the parts and programs being used were created; they were numbered incrementally in sequence and indicated the necessary requesters. Also created was a card file on parts for which programs had been or were to be developed; they indicated all technological-process operations being done on NPC machine tools.

In order to increase labor productivity when preparing and monitoring CP's and to improve their quality, the enterprise created a laboratory for the comprehensive development, calculation and monitoring of CP's and is working on the introduction of a SAP oriented towards the Unified Computer System. This system permits calculating equidistants, determining the compensation for differences in tool sweeps, analyzing and adjusting equipment operating routines with consideration of dynamic characteristics, and CP coding. The availability of the post-processor generator ensures its effective preparation for any "machine tool - NPC device" combination. The introduction of this system at an enterprise enables us to reduce CP preparation labor intensiveness by 25-30 percent and to reduce computer machine time expenditures two- to three-fold as compared with the "Kontur" SAP system.

We plan to use a number of terminals in the CP preparation bureau; they will be linked to the YeS-1022 computer installed in the enterprise information and computer center. The terminals will combine an alphabetic-digital keyboard with subscriber display-screen panels on which an input text can be displayed, checked and, if necessary, adjusted; it is then transmitted to the computer and the calculation results are obtained. Moreover, autonomous automated complexes which will include microcomputers with rather large operating memories and peripherals will also be used. Using this complex, the programmer-technologist will be able to obtain a complete CP calculation, a drawing of the cutting-tool trajectory, a printout of the program text in the NPC-device language, and a punched tape in the needed code. When necessary, the complex work results can be adjusted. Thus, the programmer will be able when preparing CP's to perform all operations, up to and including obtaining the needed tool trajectory on a graph plotter. He can run a card structure check by scanning using the NPC device right in the laboratory or on an automated complex using a service program.

Use of all these opportunities will enable us to achieve a high level of automation of the technological preparation of production and to improve the effectiveness of CP preparation and the quality of accompanying information for adjusting NPC machine tools.

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MACHINEBUILDING STRUCTURAL IMPROVEMENTS SUGGESTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 12, Mar 82 (signed to press 16 Mar 82) p 10

[Article by Doctor of Economic Sciences M. Timokhin: "Economic Mechanism of Intensification"]

[Text] One distinguishing feature of the development of implements of labor at the present stage is the creation of technically complex machines and machinery and of various kinds of units, an increasingly broad changeover to machine systems. Moreover, their production must take into account the requirements of the national economy and the population, which are changing rapidly in response to scientific and technical progress. The primary thing in this regard is that the equipment enables us to obtain good end results with the least expenditures of labor, materials and financial resources per unit of output. The demands as to technical servicing and repair of machines and machinery are also increasing. All this enriches the functions of machinebuilding in the reproduction process and alters the forms of work organization in its subdivisions and their interrelationships with equipment consumers.

Key Link in Intensification. Machinebuilding enterprises have always participated in ensuring the normal functioning of equipment they have produced: the manufacture of spare parts, repair, technical assistance, consultation, and so on. The following three parts of the country's machinebuilding complex can be delineated: first, machinebuilding associations and enterprises run by the machinebuilding ministries, which are integrally associated with specialized branch scientific research institutes and design bureaus. These include 18 basic, comprehensive branches encompassing upwards of 100 specialized subbranches and production facilities. Their primary output is machinery, equipment, apparatus, tools and spare parts for machines.

Second are machinebuilding enterprises run by nonmachinebuilding ministries as, for example, enterprises producing machines and machinery for coal and metallurgical industry which have been transferred to the corresponding ministries.

Third are machine and machine-repair shops of nonmachinebuilding enterprises, which manufacture spare parts for machinery and equipment, do major overhauls and routine maintenance, and often also produce new implements of labor.

Unity of objects of labor, of end product, and the communality of technical policy, production organization and principles of technology enable us to examine all these parts as a unified whole of the machinebuilding complex, which is called upon to meet the national economy's requirements for implements of labor and to perfect production techniques and production relations.

In national economic planning practice, machinebuilding as a branch (including metalworking) encompasses just these two parts.

Proportion of Machinebuilding and Metalworking Output in Total Industrial Production Volume (in percent)

1970	1975	1980	1985 (planned)
19.7	24.0	28.7	31.2

As we see, machinebuilding accounted for 28.7 percent of total industrial production in 1980. During the 11th Five-Year Plan, the importance of this branch will increase even more: given industrial production volume growth of 26 percent during the five years, machinebuilding output will be increased by at least 40 percent.

All parts of the machinebuilding complex ensure an acceleration of scientific and technical progress in branches of the national economy. We are fully justified in calling machinebuilding the key link in intensification. "It is through machines and technology," L. I. Brezhnev has stressed, "that science is connected to production and that progressive ideas influence it. Hence, machinebuilding has an incomparable role in developing the national economy and in increasing labor productivity."

Under present conditions, solving the problems of production intensification and improving production efficiency presuppose an interconnected examination and an economic analysis of the operation of all parts of the machinebuilding complex which ensure the production and servicing of equipment. The features of machinebuilding operation as a unified complex result not only from the essence of its components, but also from the nature of their ties, which are called upon to unite all parts of the complex into a unified whole.

Optimality of Interrelationships. One of the most important directions in which the efficiency with which the machinebuilding complex operates can be increased is the search for optimum variants of interrelationships among its component parts. In fact, achieving good end results, as applicable to machinebuilding, consists not only in producing highly productive energy-, materials- and labor-saving equipment, but also, as was pointed out at the 26th Party Congress, in machinebuilding's actively assisting the effective use of machines and equipment by consumers. This task can be resolved, in our view, by broadening the participation of machinebuilding enterprises in the installation, start-up and adjustment of equipment and determining (recording) its economic effectiveness in operation, as well as in company repair of technology and equipment (which is economically advantageous from the viewpoint of the operation of all branches of industry).

Perfecting the organization of equipment repair and service will permit the more effective use of the existing stock of machinery and equipment. Up to 45

percent of the entire stock of the country's metalworking equipment and up to 5-6 million workers are concentrated in the machine-shop and mechanical repair subdivisions. Overall expenditures for the national economy as a whole just on the repair of machinery, equipment and means of transport are 40 billion rubles per year. Production organization and technology in the machine shops and mechanical repair shops, in which the bulk of this work is done, need serious improvement.

Combining machinery production, repair and modernization in a single complex, where economically justified, is becoming increasingly necessary. Major overhauls of machinery and equipment ensure not only restoration of their utility value, but also, in part, their modernization. And the problem of rapidly updating the active portion of fixed production assets is currently a very critical one. For example, the intensive operation of machinery and equipment in order to recompense their costs as quickly as possible is advantageous in rail transport, agriculture and other branches.

A high scientific-technical level of production will be maintained more successfully if equipment manufacturing plants participate directly in the overhaul and modernization of machinery. This will permit a timely rise in the technical level of machinery and equipment.

Some experience has been accumulated in our country in the centralized repair of machine tools, electrical equipment, measuring devices and computer equipment by plants of the machinebuilding branches. Thus, the "Stankoremont" association, which includes 11 specialized enterprises, has been created in the Ministry of Machine Tool and Tool Building Industry system.

Company servicing of electrical equipment is done by the "Soyuzelektrotekhprom" industrial association created in the Ministry of Electrical Equipment Industry; 13 production-technical associations and enterprises are subordinated to it. Their experience testifies to the high resultancy of the centralized services which have been created -- repair quality is significantly higher and labor intensiveness is substantially lower. Thus, whereas the average labor intensiveness of major overhauls on a 7 kV electric motor is 31-32 norm-hours in electrical repair shops (workshops) at industrial enterprises, it is 6-7 norm-hours at a specialized repair plant. And the net cost of the repairs is 1.5- to two-fold lower.

Development of the machinebuilding complex in the 1980's must, we feel, move along the line of further expanding the "machine-service" sphere. There is experience in solving this problem. For example, a diesel service facility was created more than three years ago at the machinebuilding plant imeni 25 October in Pervomaysk. This subdivision has permanent support centers in Leningrad, Nikolayev, Kherson and other industrial centers and regions of the country. Center personnel install, break in, adjust, overhaul and service diesel engines, offer consultation on machines and render other services. The creation of this subdivision was a result of a search by the collective for ways of further improving the reliability, service life and other technical specifications of the units.

The diesel service facility performs more than 700,000 rubles worth of service annually and guarantees that an overhauled diesel will have at least 90 percent the efficiency of a new unit, an indicator yet to be achieved by a single foreign company. An exchange stock has been created under an agreement with a number of client enterprises, reducing unit repair time several-fold. Workers from enterprises using the equipment can improve their skills in special courses at the plant.

In recent years, machinebuilding ministries have been taking steps to reduce machinery and equipment repair and service expenditures in the operating area. This past five-year plan, the Ministry of Automotive and Tractor Industry admitted personal-use passenger cars to its repair and service system in 10 union republics. In 1980, the "Avtotekhobsluzhivaniye" association performed 160 million rubles worth of service. We anticipate increasing passenger car servicing to the population 43 percent in the 11th Five-Year Plan. New forms of work will be developed in the automotive service system -- call service, subscription repair and servicing and pre-registered service.

Based on Target Programs. Machinebuilding must be developed faster in the 11th Five-Year Plan along such important lines as the creation of machines for fundamentally new, highly-productive energy- and materials-conserving technologies and improving the unit capacity, productivity and reliability of equipment. The production of machine systems and preset-control automatic manipulators is being increased significantly. The centralized production and repair of spare parts and items with interbranch applications will be further developed.

There will be positive shifts in the structure of machinebuilding output -- the proportion of progressive types of equipment, means of comprehensive production mechanization and automation, in which the achievements of science and engineering are materialized in the most highly integrated form, is being increased. In 1980, industry had about 90,000 comprehensively mechanized and automated sectors, shops and production facilities, about four times the number in 1965. This process is occurring even faster in machinebuilding. During that same period, the number of comprehensively mechanized and automated large production facilities in this branch increased nearly six-fold.

Effective operation of the machinebuilding complex given a deepening and the increasing complexity of economic ties depends largely on the level of interbranch organization of this work.

Organizing management of the machinebuilding complex must include interconnected measures being carried out at all stages of the development and operation of machinery and equipment. In order to do this, it is appropriate to make extensive use of target-program planning and management methods. The development of target programs provides an opportunity to shift from carrying out isolated measures to the comprehensive provision of all links of social production with a system of machines, to better link capital construction plans to material and technical supply plans. One example of a comprehensive approach would be the target program currently being developed for mechanizing lift-transport, loading-unloading and warehousing work in industry, agriculture, transport, trade and material-technical supply and marketing.

It seems to us that it is also appropriate to anticipate the use of modern forms of equipment servicing in the production retooling programs being drawn up in large associations and individual branches. Under these conditions, the impact of the large-scale implementation of new developments and progressive types of machinery and equipment in the national economy would be substantially enhanced by the impact from improved "machine-service."

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FIRST STATE BALLBEARING PLANT CELEBRATES 50TH ANNIVERSARY

Moscow EKONOMICHESKAYA GAZETA in Russian No 14, Apr 82 (signed to press 27 Mar 82) p 2

[Article by M. Makhlin: "Anniversary of the First GPZ (State Ball-Bearing Plant)"]

> [Text] The First State Ballbearing Plant, in Moscow, is celebrating 50 years of operation. The enterprise collective is marking its anniversary with new successes in socialist competition. The homeland places a high value on the services of GPZ-1 and has awarded it the Labor Red Banner order on the eve of its day of celebration.

Half a century ago, on 29 March 1932, Sergo Ordzhonikizde signed a People's Commissariat of Heavy Industry order which began with these words: "Through the heroic efforts of workers, engineering-technical and administrative-managerial personnel, under the leadership of the Leninist Central Committee and MK [probably: Moscow Committee] of our party, the first line of a gigantic new plant, the No 1 ball- and roller-bearing plant, with a total annual capacity of 24 million units, becomes operational; it was built in one year."

Let us compare those lines with today's situation. Plant economists recently estimated that GPZ-1 is now producing eight times as many bearings as in 1940 in production area equal to those existing in the pre-war years and that labor productivity is eight times higher. This testifies to the high technical level of production here.

It is to the point to recall, in this connection, the malicious reaction of certain Western circles to the "Soviet miracle" accomplished 50 years ago. The start-up of GPZ-1 in fact signalled the emergence of Soviet science and engineering onto the most advanced frontiers and freed our country of the need for deliveries of very important assembly components for machinery from abroad. For example, 22 million rubles in gold was spent in 1931 purchasing bearings. GPZ-1 bearings are now exported to 40 other countries. Introduction of the enterprise permitted the rapid development of domestic automotive and tractor industry, aircraft building and other machinebuilding branches.

GPZ-1 shops now manufacture more than 2,000 types of bearings in nearly all design groups and precision classes, from miniature items only 25 mm in diameter to seven-ton giants three meters in diameter. Comprehensively mechanized shops make half the bearings. The plant has 325 automated and mechanized lines and

thousands of machine tools equipped with special installations ensuring high precision and productivity. More than half the bearings bear the state Badge of Quality. During the 10th Five-Year Plan alone, the durability of these items was increased 20-25 percent.

The 11th Five-Year Plan has become a special stage in GPZ-1 development. Production volume must increase 10.7 percent during 1981-1985 and labor productivity must increase 14.5 percent. The center of attention for the collective is held by questions of saving resources and lowering output net cost. Last year alone, material expenditure norms were lowered 3.8 percent as compared with those then in effect.

The enterprise is a major consumer of light-alloy steel. A joint search by plant workers and specialists from the VNIIMetmash [All-Union Scientific Research, Planning and Design Institute of Metallurgical Machinebuilding] and All-Union Scientific Research Institute of Bearing Industry was aimed at lowering specific expenditures of that material. Socialist obligations for the current year anticipate a savings of an additional 500 tons of metal, eight million kilowatt-hours of electricity and 450 tons of conventional fuel.

The collective has begun its anniversary year confidently. The assignment for the first quarter has been successfully met. More than 500 workers who obligated themselves to meet their personal plans for the first three months of the year ahead of schedule have kept their word.

Among the leaders in the competition was grinder Nina Yefimovna Antonova. As was A. A. Gromov, GPZ-1 director, she was a delegate to the 17th USSR Congress of Trade Unions.

"I especially recall the words from Leonid Il'ich Brezhnev's speech," says this leading worker, "in reference to innovators as the scouts in our overall labor assault. I decided to take on joint obligations with my former teacher, Yekaterina Grigor'yeva. The main thing was for her to also take a leading position. Incidentally, I drew the idea for this paired competition from speeches at the trade union congress. It seems to me that if all our leading workers joined this movement, it would be our contribution to organizing a nationwide approach to high labor effectiveness.

There really are a great many leading production workers at GPZ-1. Hundreds of workers and specialists have been given high state awards. The nearly 20,000-strong GPZ-1 collective has become a real forge of cadres for other branch enterprises and has reared many important production organizers.

GPZ-1 renovation is in full swing. A number of leading shops are to be moved into a new manufacturing facility being built in the Lyublinsk section of the capital. The first start-up complex will begin operations this year. Particular attention is being paid to improving working conditions and even more automatic machines will be used here.

Start-up of the new facility will enable the collective to resolve the task set it in the 11th Five-Year Plan, to significantly increase the release of very high-precision and high load-capacity bearings.

The first-born of domestic bearing industry is greeting its half-century jubilee in upward flight.

[Captions to photos not reproduced for this report:]

Well-known grinder N. Antonova (left), delegate to the 17th Congress of Trade Unions, and her former teacher, V. Bogdashkina.

The GPZ-1 collective today is an amalgam of youth and skill. In the picture (from left to right) are R. Bormoteva, one of the best tutors of young people and an inspector foreman, and two young workers, O. Bikeyeva, a grinder, and A. Rob'kin, a trouble-shooter.

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FIRST STATE BALLBEARING PLANT MARKS 50 YEARS IN OPERATION

Moscow KRASNAYA ZVEZDA in Russian 28 Mar 82 p 1

[Article by V. Shkol'nikov, GPZ-1 deputy general director: "50 Years In Operation"]

> [Text] On the pediment of the First State Ballbearing Plant [GPZ-1] is the Order of Lenin and the October Revolution. These have been deserved landmarks in the labor path of the much-honored enterprise, which marks its 50th anniversary tomorrow. Deputy general director V. Shkol'nikov talks about the achievements with which GPZ-1 approaches this remarkable date at the request of a KRASNAYA ZVEZDA correspondent.

The Exhibit of National Economic Achievements is just opening an exhibit which tells of the labor successes and output of ballbearing workers this past five-year plan. Our plant produces 3,500 type-sizes of bearings weighing from 30 grams to six tons. They are in hard use on the land and above the land, in the ocean seas and in the heavens. The range of application for our products includes children's carriages and moon-buggies.

For the first time in our history, we have developed comprehensively automated shops which now produce nearly half the enterprise's output.

It was largely due to fruitful ties with scientists and designers that we were able to provide the shops with the most modern equipment. The enterprise is linked by cooperative ties with more than 30 scientific research institutions. This cooperation has yielded an economic impact in the millions of rubles each year.

Socialist competition in honor of the 60th anniversary of the formation of the USSR has been developing increasingly broadly at the plant. Its tone has been provided by communists such as Hero of Socialist Labor N. Motov, a grinder, and Order of Lenin holder A. Afonin, a former serviceman and now a forge-stamp operator. Incidentally, more than 2,000 people who saw action at the front work in our collective and a third of our young workers are in the reserves.

We are now embarked on a retooling program and are building a branch in Lyublino which will be the equal of our current plant. By the end of the 11th Five-Year

Plan, we must have completed this general renovation. It will facilitate successful fulfillment of the tasks set the branch by the 26th Party Congress, whose materials state, in particular: "Further develop ballbearing industry...."

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METALWORKING EQUIPMENT

ROBOTS INSTALLED AT BALAKOVO REZINOTEKHNIKA PLANT

Moscow GUDOK in Russian 27 Mar 82 p 1

[Article: "Robots Come to the Shop"]

[Text] (Balakovo, Saratovskaya Oblast) Robots have replaced workers at machine tools in "Balakovorezinotekhnika" production association, a satellite of the Volga and Kama automotive plants. The Balakovo plant ships to 600 customers.

The enterprise products list includes more than 2,000 items essential to the manufacture of automobiles. And no matter how different the methods of manufacturing, for example, seat backs or rubber collars, nearly every part is pressed or stamped. The association has for the first time begun shifting this monotonous, low-productivity labor onto the shoulders of machines. And so we have the first robot machine tools.

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WRITE-UPS IN MINISTRY OF POWER MACHINEBUILDING SCORED

Moscow IZVESTIYA in Russian 9 Jun 82 p 2

[Article by V. Kostin: "Bonuses for Write-Ups..."]

[Text] Let's call a spade a spade: write-ups are a crime. A plan has in fact not been fulfilled, but the documents indicate it has even been overfulfilled. Hence, a prize-winning finish in the competition and material benefits.

People's monitors have established that there were 5.05 million rubles in write-ups on sales volume and 1.24 million rubles in write-ups on normative net output due to fictitious documents at the "Khar'kov Turbine Plant" production association (general director, Comrade Abramovskiy) in August, November and December of last year. Included in the reporting were three unfinished low-pressure steam turbine rotors. The working vanes of the fourth and fifth stages of the turbine had not been installed on the January inspection day this year, nor had the rotor dynamic balancing anticipated in the specifications been done. In spite of this, the enterprise was reported as having carried out the plan, which was in fact not carried out. And that was not the sole such instance in the Ministry of Power Machinebuilding system.

Comrade Chefranov, director of the Belgorod Power Machinebuilding Plant, lost his sense of responsibility for the work entrusted to him and illegally included incomplete sets of pipeline in the volume and products list for January-April 1981. Their manufacture was completed only in July.

Write-ups enabled the plant leadership to report to the ministry fulfillment of first-quarter assignments by 101.2 percent for sales and 100.1 percent for products list. Supervisory and engineering-technical workers received 151,060 rubles in bonuses. Moreover, as the winner in the socialist competition among enterprises of the Ministry of Power Machinebuilding, the plant collective was awarded a 35,500-ruble bonus. It was awarded the challenge Red Banner of the ministry and the trade-union central committee.

The leadership of "Krasnyy kotel'shchik" production association (general director, Comrade Parshin) also took the path of window-dressing and tried to create an apparent well-being. Knowing that a significant portion of the heat-exchange equipment was not ready, it included nine units whose manufacture continued for 2-9 months after the report was submitted in the commodity production report for March 1981. Output write-ups were also permitted in June-September.

One wonders where the ministry did its inspecting. It turns out that, instead of constant monitoring of the operation of these enterprises, the ministry itself indulged violations of the law and consented to the inclusion of unfinished production in the reporting.

Equipment included, with ministry permission, by the Izhorskiy plant in output volume last January and kept in storage was in fact manufactured and shipped out in sets to the Podol'sk Machinebuilding Plant for further processing only eight months after its cost was included in a report. And other types of body parts were also included in volume indicators in a similar manner.

Incidentally, distortions of state reporting were also revealed at the Podol'sk Machinebuilding Plant (director, Comrade Chernov).

What conclusion can be drawn from this? A law is passed which strictly punishes write-ups. Economic leaders of all ranks are aware of it and are obligated to observe it. But some know of it and...break it.

Those to blame for write-ups sometimes say in their defense that it was done to retain personnel and protect the good name of the collective. In actuality, leaders who permit write-ups and force their subordinates to do so materially damage the state and morally damage the collective.

Several days ago, the collegium of the USSR Ministry of Power Machinebuilding met to review this question. A ministry order severely punished the leaders cited in the article. Also punished was Comrade Volkov, head of the ministry accounting and reporting administration. The association general directors, enterprise directors and the technical control department engineers and chiefs were warned of their personal responsibility for distortions in reporting and that disclosure of such instances will result in severe punishment, with materials on write-ups and deception being transmitted to the procurator's office.

This step is in fact necessary. It is important that it be followed by practical action to strengthen discipline and order, which the Ministry of Power Machinebuilding has thus far lacked.

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BASHKIRIA ECONOMY EFFORTS IN MACHINEBUILDING

Moscow EKONOMICHESKAYA GAZETA in Russian No 27, Jul 82 (signed to press 28 Jun 82) p 12

[Article by S. Kulikov, Bashkiria board chairman, Scientific and Technical Society of Machinebuilding Industry: "Contribution of Specialists"]

[Text] The machinebuilding enterprises of Bashkiria require dozens of tons of ferrous and nonferrous metals annually. In the course of the Unionwide Public Economy Review, many labor collectives achieve a significant reduction in the metals-intensiveness of output being produced and a higher metal use coefficient. The experience of the Sterlitamakskiy Machine-Tool Building Plant imeni Lenin is particularly interesting.

Quite recently, machine-tool builders were justifiably complaining about the low level of metal use, especially hot-rolled metal. And the quality of the machine tools being produced left much to be desired. The situation has now changed considerably. In cooperation with scientists at Ufa Aviation Institute, this plant has, for example, developed a new line of honing machines in 14 modifications. They are distinguished by an efficient arrangement of components which permits a significant reduction in metals-intensiveness. On the recommendation of institute associates, the design of the series-produced numerical programmed control vertical drill was also changed, reducing metals-intensiveness and simultaneously improving productivity and machining precision.

Another reserve for saving metal at the enterprise is improving technological processes. Open forging has been successfully replaced by high-precision positive-displacement stamping. In casting, liquid self-hardening mixtures are extensively used in the manufacture of cores, permitting improved casting precision and a two-fold reduction in the amount of metal used to reinforce cores. The products list of precision castings using smelted patterns is constantly being expanded and technology has been mastered for making parts of bronze by centrifugal casting in chill molds, resulting in an annual savings of 150 tons of hot-rolled metal and 10-12 tons of bronze.

However, the introduction of resources-conserving technological processes at the Sterlitamakskiy Machinebuilding Plant, as well as at others, has run into a number of problems. For example, 100-ton and larger hydraulic presses are needed for pressing parts using powder. But not enough of these presses are being

produced. We also need to increase the production of technological equipment complexes needed for precision stamping-superplastic parts.

The designers and technologists at machinebuilding enterprises could be making a large contribution to saving metal. Why, then, do they sometimes remain uninvolved? One reason is that consideration is not given to indicators of lowering the metals-intensiveness of items or saving metal in the production process when the work results of designers and technologists are evaluated. This situation must unquestionably be corrected. The role of designers and technologists in resolving the tasks of saving metal must be increased.

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NOVOCHERKASSKIY MACHINE-TOOL BUILDING PLANT RESPONDS TO CRITICISM

Moscow EKONOMICHESKAYA GAZETA in Russian No 27, Jul 82 (signed to press 28 Jun 82) p 13

[Article by V. Suleymanov, director of the Novocherkasskiy Machine-Tool Building Plant: "Response to the article 'Path to...Remelting?' (No 19, 1982)"]

[Text] This article was discussed at a joint meeting of the Novocherkasskiy Machine-Tool Building Plant administration and party bureau. The criticism addressed to the plant was acknowledged to be correct.

Equipment costing 292,000 rubles which had been stored at the plant for more than two years was sold under contract to enterprises in Kiev and Severodvinsk. The plant leadership asked the "Soyuzstankoprom" VPO [probably: all-union production association] to transfer unneeded equipment to other enterprises of the association.

A plan of measures was worked out to involve above-normative stocks of raw and other materials and equipment available at the plant in production as quickly as possible.

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